

REMARKS

Claims 1-5 and 7-17 are pending in this application. Claim 15 has been objected to and claims 1-5 and 7-17 have been rejected. Claims 1, 8 and 11 are independent.

By this Amendment After Final Rejection Applicants seek to cancel claims 3, 9 and 15, to revise the specification and claims 1, 2, 4, 5, 7, 8, 10-14, 16 and 17, and to add claim 18. Upon entry of this Amendment After Final Rejection claims 1, 2, 4, 5, 7, 8, 10-14 and 16-18 will be pending and claims 1, 2, 8, 11 and 18 will be independent.

The proposed changes to the specification conform paragraph [0004] of the detailed description to Fig. 12 and rectify a minor point in paragraph [0007]². No new matter has been added.

Support for the changes to the claims, and new claim 18, can be found throughout the application as filed, for example, in Figs. 1 and 3-5, and in the corresponding portions of the specification. No new matter has been added.

The Objection to the Claims

Claim 15 has been objected to on grounds the term "clams" on line 2 should be changed to --claims--.

The Examiner is thanked for calling attention to this inadvertent misspelling.

Given the cancellation of claim 15, this objection is now moot. Accordingly, withdrawal of this objection is respectfully requested.

² Again, the paragraph numbering of the specification as originally filed has been used, not the numbering in the disclosure published on March 11, 2004.

The Rejections Under
35 U.S.C. § 103

Claims 1-5, 8-12, 15 and 16 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,610,635 to Murray et al. in view of U.S. Patent No. 5,838,549 to Nagata et al. Applicants respectfully traverse this rejection and submit the following arguments in support thereof.

First, it will be appreciated that the cancellation of claims 3, 9 and 15 renders moot the corresponding portions of this rejection.

Applicants' invention, as described in claim 1, relates to an ink cartridge having a receptacle with an ink chamber for storing ink, and a circuit board having a storage device for storing data relating to the ink. The circuit board is disposed on the receptacle and includes at least two ground terminals, each having a ground contact portion, that are located on one axis thereof, the ground contact portions being arranged in a first row having outermost ends, and plural terminals, each having a contact portion, arranged on the circuit board, for read/write operations on the data relating to the ink, the terminals including a power supply terminal, the contact portion of the power supply terminal being arranged in a second row parallel to the first row. The ground contact portions are not the terminal contact portions in closest proximity to the power supply terminal contact portion and are located at the outermost ends of the first row. The first row is located further from a center of the circuit board than the second row.

Claim 2 concerns an cartridge with a receptacle having an ink chamber for storing ink and a circuit board having a storage device for storing data relating to the ink. The circuit board is disposed on the receptacle and includes at least two ground terminals that are located on one axis thereof, the ground terminals being arranged in a first row, and plural terminals arranged on the circuit board, for read/write operations on the data relating to the ink, the

terminals including a power supply terminal, at least some of the plural terminals being arranged in a second row parallel to the first row, each row having outermost ends. The at least two ground terminals are not the terminals in closest proximity to the power supply terminal and are located at the outermost ends of the first row, and the first row of terminals is located further from a center of the circuit board than the second row.

Next, claim 8 relates to an ink cartridge that includes a receptacle having an ink chamber for storing ink and a circuit board with a storage device for storing data relating to the ink, the circuit board having a substantially rectangular shape, and the circuit board itself having two ground terminals along one side thereof, the ground terminals being arranged in a first row having outermost ends, and plural terminals arranged parallel to one side of the circuit board, and used for storing the data. The terminals include a power supply terminal, and at least some of the terminals being arranged in a second row parallel to one side of the circuit board and parallel to the first row. The two ground terminals are not the terminals in closest proximity to the power supply terminal, and are arranged at the outermost ends of the first row, and the first row of terminals is located further from a center of the circuit board than the second row.

As set out in claim 11, Applicants' invention also is directed to an ink cartridge that includes a receptacle having an ink chamber for storing ink and a circuit board. The circuit board has a storage device for storing data relating to the ink, and terminals arranged on the circuit board, the terminals including a power supply terminal, and the terminals being arranged in rows. Two of the terminals are ground terminals arranged so that a printing device can determine if the ink cartridge has been installed correctly, and the ground terminals are located at the outermost ends of a first row of terminals that differs from a second row of the terminals that contains the power supply terminal. The first and second rows are parallel, and the ground

terminals are not the terminals in closest proximity to the power supply terminal. The first row of terminals is located further from a center of the circuit board than the second row.

Applicants respectfully submit that the combination of cited references does not even suggest the claimed invention, because that combination does not lead one skilled in the art to the claimed arrangement of terminals. By way of non-limiting example, the independent claims discussed above, and newly-presented claim 18³, provide for two parallel rows of terminals, and ground terminals being located at the outermost ends of the row that is further from the center of the circuit board.

Murray, as shown in Figs. 3, 6 and 7, teaches that the ground terminals 90 and 106 are located at the outer ends of the row of terminals that is **closer** to the center of the circuit board, precisely the opposite of the claimed invention.

While Murray states at col. 10, lines 47-51, that other wiring layouts may be employed, this does not explicitly suggest the claimed arrangement. At best, this is a mere suggestion it is obvious to try other arrangements. The "obvious to try" standard is criticized in M.P.E.P. § 2145(X)(B). Murray does not contain any suggestion that would lead one skilled in the art to the specific terminal arrangement that is recited in the claims. Nor would one skilled in the art have any reason, in the absence of undue experimentation, to rearrange Murray's terminals to arrive at the configuration of the claimed invention.

Murray therefore does not teach the claimed arrangement of terminals.

Nagata does not remedy Murray's deficiencies. Nagata, as shown in Figs. 1 and 4, teaches just a single row of terminals, not two rows of terminals, much less two parallel rows

³ Newly-presented claim 18 includes additional features that one skilled in the art will appreciate also patentably distinguish over the art of record.

of terminals arranged as claimed. Nagata therefore does not suggest the features of the claimed invention just shown to be lacking in Murray.

Applicants further traverse this rejection on grounds that it is not appropriate to apply Murray as a primary reference, since the present invention specifies a configuration in which the two ground terminals are not the terminals in closest proximity to a power supply terminal in order to obtain the intended objective of avoiding short-circuiting. As the Office Action **admits**, and as is clear from Fig. 6 of Murray, Murray teaches power supply terminals which are in **closest** proximity to the ground terminals. It will be appreciated that this is precisely contrary to the invention as claimed.

Further, Murray does not disclose or even suggest two of the objectives of the present invention, preventing short-circuiting between ground terminals and a power supply terminal, or detecting the proper installation of an ink cartridge (these benefits are discussed at paragraphs [00050], [00051], [00064], [00065] and [00071] of the original specification). Murray lacks structure that could accomplish these objectives and, as explained above, discloses a configuration having the power supply terminals located **closest** to the ground terminals, and so conflicts with these objectives.

Even if Murray is applied as the primary reference, Murray leads one skilled in the art away from the claimed invention, as noted above.

Applicants also respectfully traverse the combination of Murray and Nagata on grounds the teachings of the two references prevent their combination.

As shown in Fig. 6 of Murray, two rows of contacts are provided, and the ground contacts 90 and 106 are located in one row, while power contacts 92, 104 and 108 are located in the other row. Murray states that the wiring layout shown in Fig. 6, in which the contacts 90, 92,

94, 96, 98, 100, 102, 104, 106, 108 are arranged in two rows, is the **preferred** wiring layout (col. 10, lines 47-48).

In contrast, Nagata teaches that, as shown in Fig. 1, the power contact Vcc and ground contact Gnd are located in the same row. Nagata says this arrangement of contacts reduces noise (col. 6, lines 36-49). So one applying Nagata's teachings to Murray would necessarily use Nagata's single row contact arrangement. However, that would require a terminal arrangement different from the arrangement that Murray says is preferred.

Furthermore, it should be noted that Nagata, as shown in Fig. 1, only teaches that one of the two end contacts is a Gnd contact. The claimed invention provides that **both** of the end contacts are Gnd contacts. One skilled in the art therefore would not be led by Nagata to modify Murray in a way that would lead to the claimed invention.

Murray is markedly different from the claimed invention, and any attempt to modify Murray in a way that would arguably suggest the claimed invention would render Murray unfit for its intended purpose. That is, modifying Murray as taught by Nagata would lead to a single row of terminals, and that arrangement would prevent the modified cartridge from being used in Murray's printer.

M.P.E.P. § 2143.01(V), entitled "The Proposed Modification Cannot Render the Prior Art Unsatisfactory for its Intended Purpose", states "[i]f proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification".

Accordingly, Murray is clearly distinguishable from and not readily combinable with references that may teach contacts arranged at the outermost ends of a row of terminals without mentioning the location of the power supply terminal. Applicants respectfully submit

one skilled in the art would not combine Murray with Nagata, because such a combination would require Murray's two rows of contacts to be replaced with Nagata's single row of contacts, and Murray states the two rows of contacts is a preferred arrangement. In other words, the asserted combination would require use of Nagata's contact arrangement, but Nagata's contact arrangement would preclude use of the contact arrangement that Murray says is desirable.

Nevertheless, even if Nagata is combined with Murray the resulting teachings still would not suggest the present invention because Nagata fails to remedy Murray's deficiencies. Murray teaches power supply terminals that are in closest proximity to the ground terminals, whereas Nagata teaches a configuration where at least a ground terminal is not in closest proximity to the power supply terminal.

For example, Nagata discloses terminals Vcc and Gnd which are separated from each other. However, Nagata does not even suggest the concept of detecting the proper installation of a circuit board (this invention involves in part circuit board structure enabling detection of the proper installation of the circuit board, which is done with two ground terminals located at the outermost ends of a row of terminals). The Office Action does not identify any reference(s) that even suggest to one skilled in the art such a terminal arrangement (two ground terminals are located at the outermost ends of one of several rows of terminals, the two ground terminals not being the terminals in closest proximity to the power supply terminal).

Neither Murray nor Nagata suggest arranging terminals in the manner claimed, so that the ground terminals are at the outermost ends of a row of terminals that is further from the center of the circuit board than a parallel different row of terminals.

Since Nagata fails to remedy Murray's deficiencies with regard to the presence of the storage device and the arrangement on contacts, the claimed invention patentably distinguishes over the combination of Murray and Nagata.

For all the foregoing reasons, favorable reconsideration and withdrawal of this rejection are respectfully requested.

Claim 14 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Murray in view of Nagata

Claim 14 ultimately depends upon claim 11, and so incorporates by reference all the features of claim 11, including those features just shown to avoid Murray and Nagata. Claim 14 therefore patentably distinguishes over Murray and Nagata at least for the same reasons as claim 11, which reasons are incorporated by reference herein.

Accordingly, favorable reconsideration and withdrawal of this rejection are respectfully requested.

Claim 7 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Murray in view of Nagata as applied to claims 1 and 3-5, and further in view of U.S. Patent No. 5,748,179 to Ito et al. Applicants respectfully traverse this rejection and submit the following arguments in support thereof.

Claim 7 ultimately depends from, and so incorporates by reference all the features of claim 1, including those features shown above to avoid Murray and Nagata. Claim 7 therefore avoids Murray and Nagata at least for the reasons already given with regard to claim 1, which reasons are incorporated by reference herein.

Ito only is cited as teaching a circuit board having plural terminals arranged at intervals of approximately 1 mm in the direction of formation of the rows.

Ito is directed to an LCD device having driving circuits with multilayer external terminals. As such, Ito is not properly combined with the other cited references, which relate to an ink jet cartridge and contact arrangements for an integrated circuit, respectively.

Even assuming *arguendo* Ito can be combined with Murray and Nagata, it remains that Ito does not remedy the above-noted deficiencies of those other references. Ito only relates to an LCD display, and, as shown in Fig. 21 teaches a single row of contacts arranged around the perimeter of the LCD element. There is no suggestion to provide multiple contacts, multiple ground contacts, and a power contact, much less to do so in the manner claimed. Nor is there a suggestion to provide the circuit board with contacts arranged as claimed.

Accordingly, the claimed invention avoids the combination of Murray, Nagata and Ito for the same reasons as already have been given with regard to claim 1.

For all the foregoing reasons, favorable reconsideration and withdrawal of this rejection are respectfully requested.

Claims 13 and 17 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Murray in view of Nagata as applied to claims 11 and 12, and further in view of U.S. Patent No. 6,575,548 to Corrigan et al. Applicants respectfully traverse this rejection and submit the following arguments in support thereof.

Claims 13 and 17 both ultimately depend from and so incorporate by reference all the features of claim 11, including those features just shown to patentably distinguish over Murray and Nagata. Claims 13 and 17 therefore patentably distinguish over Murray and Nagata at least for the same reasons as claim 11, which reasons are incorporated by reference herein.

Corrigan only is cited as suggesting a printer having an ink cartridge with a circuit board having contacts arranged in a particular fashion. According to the Office Action pad continuity is checked to test installation of the cartridge.

Even assuming *arguendo* that this is true, it remains that Corrigan does not even suggest the aspects of the invention shown to avoid Murray and Nagata, namely, the particular arrangement of contacts recited in the claims. Accordingly, Corrigan fails to remedy the deficiencies of the other references, meaning claims 13 and 17 patentably distinguish over the combination of Murray, Nagata and Corrigan for the same reasons that claim 11 avoids Murray and Nagata.

For all the foregoing reasons, favorable reconsideration and withdrawal of this rejection are respectfully requested.

CONCLUSION

Applicants respectfully submit that all outstanding rejections have been addressed and are now either overcome or moot. Applicants further submit that all claims pending in this application are patentable over the prior art. Favorable reconsideration and withdrawal of those rejections and objections is respectfully requested.

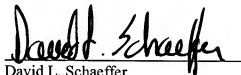
In view of the foregoing revisions and remarks, Applicants respectfully request entry of this Amendment After Final Rejection and submit that entry of this Amendment will place the present application in condition for allowance. It is further submitted that entry of this Amendment can be approved by the Examiner consistent with Patent and Trademark Office practice, since the changes it makes should not require a substantial amount of additional work

by the Examiner. It is believed that the changes presented in this Amendment address matters that the Examiner has previously considered.

Other than the fee for the requisite extension of time and the additional independent claims presented herein, no fees are believed to be due in connection with the filing of this paper. Nevertheless, the Commissioner is authorized to charge any fees now or hereafter due in connection with the prosecution of this application to Deposit Account No. 19-4709.

In the event that there are any questions, or should additional information be required, please contact Applicants' attorney at the number listed below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "David L. Schaeffer", is written over a horizontal line.

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